

Memorandum

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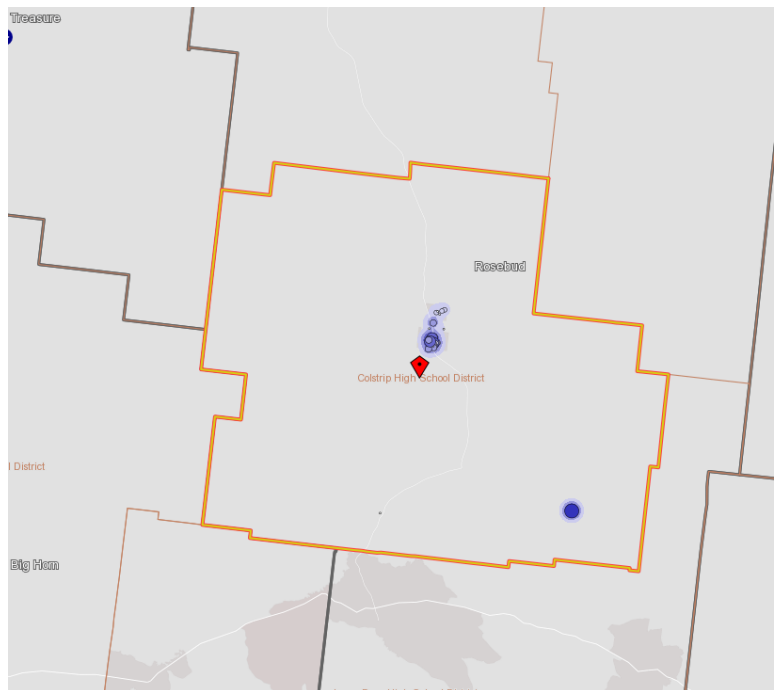
SUBJECT: Where Colstrip Workers Live

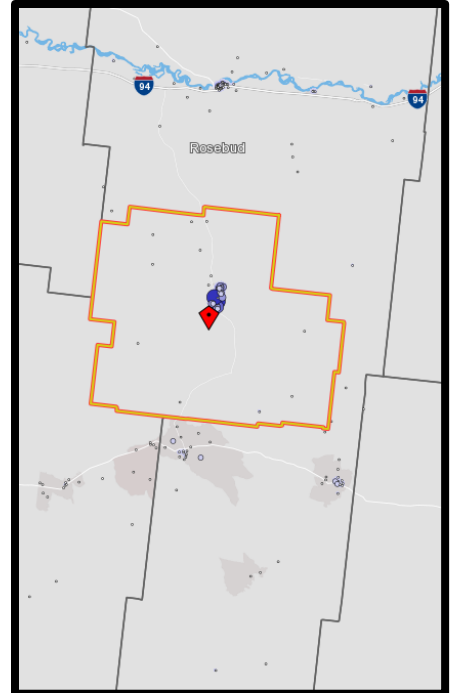
During the recent community meetings held in Forsyth, Colstrip, and Lame Deer, questions arose about the home residence of the Colstrip workforce. This memorandum provides answers to this question using the On The Map data tool of the U.S. Census Bureau (onthemap.ces.census.gov), which is a mapping tool illustrating where workers work versus where they live. This tool is available to the public at onthemap.ces.census.gov, and can be used to obtain information using census tracts, cities, counties, school districts, or other geographies. This memorandum provides the information by **high school district** because schools often are the strongest indication of community affiliation in rural areas. Directions on using On The Map are attached in case others wish to obtain data for different geographies. The most recent data available, 2015, is used in this memo.

An important caveat in using the On The Map tool (which illustrates data from the Local Employment Household Dynamics dataset) is that the data is ‘fuzzed’ to protect worker and employer confidentiality. In general, when the data is aggregated at a small enough level where any one worker or business could be identified, a fuzzing algorithm is used to hide identifying information.

According to On The Map, there were 1,148 individuals employed in primary jobs within the Colstrip High School District. The image at right illustrates the boundaries of the school district, with the purple shading providing a heat map of the concentration of jobs. This analysis only examines primary jobs, excluding secondary jobs that take up a minority of the worker’s work time. The secondary jobs were excluded to focus on jobs more likely to be impacted by the closure of Units 1&2.

The On The Map data only identifies 29 workers in utilities, which is typically the industry classification for power plants. However, it appears that many of the power plant workers are classified within the construction industry. This discrepancy may be due to the “fuzzing” mentioned above, or may be because the utility uses a number of construction and management firms to provide staffing and services. Regardless, the 432 workers in mining and the 253 workers in





construction generally seem to agree to the employment numbers published in the media about the number of workers at the mine and power plant.

The home location of the 1,148 people who work within the boundaries of the Colstrip High School District are shown in the two maps above. The first map

illustrates the broader region where workers live, while the second focuses in on Rosebud County. Over 40% of the workforce travels more than 50 miles to work. 25% of the workforce travels less than 10 miles. About 433 workers (40%) both live and work within the geographical boundary of the Colstrip High School District. The remaining 60% of the workers at businesses within the high school district live outside the district (about 715 workers).

From a slightly different perspective of looking at individuals who live within the Colstrip High School District area, roughly 45% also work within the boundaries of the geography. The remaining 55% work outside of town in other businesses.

Where Workers Live Who Work Primary Jobs Inside the Colstrip High School District Geography		
	Count	Share
Colstrip city, MT	400	34.8%
Billings city, MT	146	12.7%
Forsyth city, MT	47	4.1%
Lame Deer CDP, MT	30	2.6%
Ashland CDP, MT	27	2.4%
Miles City city, MT	24	2.1%
Hardin city, MT	11	1.0%
Lockwood CDP, MT	11	1.0%
Busby CDP, MT	10	0.9%
Laurel city, MT	8	0.7%
All Other Locations	434	37.8%
Source: LEHD data through On The Map, U.S. Census Bureau		

Among workers who work inside the school district's boundaries, roughly 400 (35%) live in Colstrip. The remaining workers live in the following areas indicated at the table at left.

Colstrip Workers by Home Zip Code

The workers who work within the geographical boundaries of the Colstrip High School District can also be divided by the zip code of their home residence, which may provide more information than the Census places indicated in the above table. The table at left illustrates the breakdown of workers by zip code.

Workers Living in Forsyth and Lame Deer

The same data source can be used to analyze where the residents of Forsyth, Ashland, and Lame Deer work. This section continues the practice of using the geographical boundaries of the high school district to define communities. Among individuals who live in the geographical boundaries of the Forsyth high school district, roughly half work in the Forsyth 59327 zip code area (366 people). About 10% work in the Ashland 59003 zip code (75 people), and 4% work in the Colstrip 59323 zip code (26 people). Miles City and Billings also are the work location for many people who live in Forsyth.

For people who live inside the geographical boundaries of the Lame Deer High School District, 40% work within the Lame Deer zip code of 59043. There are about 20% (285 workers) who work in the Ashland zip code of 59003, and 7% (92 workers) who work in the Forsyth zip code 59327. Roughly 3% (44 workers) work in Crow Agency, and 2% work in Colstrip (29 workers). Individuals who live in Lame Deer also work in Billings and Miles City.

The Lame Deer High School District also includes the towns of Busby and Ashland. For more details on the residents of these counties, the attached directions can isolate the communities based on city limits.

Worker Demographics

Although not the primary point of this memo, the On The Map tool also provides information on the demographics of the local workforce. This section of the memo compares the demographics of workers who work inside the geographical boundaries of the Colstrip High School District to the demographics of all workers in Montana.

Workers within the Colstrip High School District boundary tend to be slightly older than all Montana workers. Both in Montana and in Colstrip, roughly 51% of the workers are between the ages of 30 to 54. However, roughly 30% of Colstrip workers are 55 or older compared to 26% statewide.

Not surprisingly given the industries, Colstrip workers tend to have much higher wages than workers in Montana generally. In Colstrip, 2/3rds of the workforce makes more than \$3,333 per month. Only 38% of workers statewide fall above this amount.

Home Zip Codes of Colstrip Workers			
Zip	Zip Area	Count	Share
59323	Colstrip	421	36.7%
59327	Forsyth	92	8.0%
59101	Billings	68	5.9%
59102	Billings	51	4.4%
59043	Lame Deer	39	3.4%
59301	Miles City	39	3.4%
59105	Billings	37	3.2%
59003	Ashland	30	2.6%
59106	Billings	22	1.9%
59034	Hardin	17	1.5%
All Other Locations		332	28.9%
Source: LEHD data through On The Map, 2015, U.S. Census Bureau			

Colstrip workers are slightly more racially diverse than workers statewide. 88% of Colstrip workers are white versus 93% statewide. Roughly 9% of Colstrip workers are Native American versus 5% statewide.

Colstrip workers are much more likely to be male than workers statewide. The state is evenly split between male and female workers, with females comprising 50.4% of the workforce in 2015. Colstrip's workforce is 65% male.

Colstrip workers are roughly equal to the state in the percentage of workers without a high school diploma. However, fewer workers have bachelor's degrees or higher in Colstrip than the state. The table below illustrates the educational attainment of the state workforce and the Colstrip workforce in 2015.

Comparative Educational Attainment of Workforce		
	State Workforce	Colstrip Workforce
Less than high school	7.6%	8.8%
High school or equivalent, no college	25.7%	31.4%
Some college or Associate degree	26.5%	28.1%
Bachelor's degree or advanced degree	17.7%	12.7%
Not available	22.5%	18.9%
Source: Includes workers 29 and older. LEHD data through On the Map, U.S. Census		

Directions to Use On the Map

1. Go to <http://onthemap.ces.census.gov/>. You can also google OnTheMap to find the page.
2. The first task is to select an area. This example is for Lewis and Clark County and the City of Townsend, but the same steps can be used for any geography.
 - a. In the left pane, there is a box labeled Search. In the Search field, **type** "Lewis and Clark County" and push **the search button**.
 - b. A list of regions should appear, with Lewis and Clark County listed under Counties. Click on the word **"Lewis and Clark County, MT."** This will make Lewis and Clark County as your selection area. If you want data on the full county, click on **"Perform Analysis on Selection Area"** in the popup bubble on the map, then go to step 3. If you are interested in a smaller area, or multi-county area, please continue to c.
 - c. Typing in Lewis and Clark County zoomed the map into Lewis and Clark County, but also automatically made the county our selection area. If you want a multi-county region, a sub-county region, or you want to compare to regions, click **"Change Selection Area."** Zoom in on the map by pressing the plus button on the map scale until you are zoomed into the City of Townsend in Broadwater County. You may need to center the map on Townsend by double clicking on the map or holding the button down as you move the mouse. There are a number of ways to select the area of interest.
 - i. Click the "Draw Point(s)" button in the left pane, then click on the map in the City of Townsend. It should leave a pink dot. In the left pane, under Add Layer Selection, select Places (Cities, CDPs, etc). Then, at the top of the left pane, click on Confirm Selection.

- ii. You can draw a polygon around the selection. Click Draw Polygon, then click once on the map near the region of interest. Then drag your mouse slightly across the map and click again. Drag and click again to form a triangle. Continue to do this until you have drawn a polygon around the region of interest, then double click on your last point. The selection will turn pink. Click on Confirm Selection.
 - iii. Draw line works similarly to polygon, except every region you draw your line through will be selected. Click on Confirm Selection.
 - iv. You can also select rings, donuts, and plumes around your selected region, specifying how far you want the radius of the selection area in miles. If data is not available, this method may automatically select the full county. You may select any region, including those that span borders. For example, you could select both Idaho County, ID and Ravalli County, MT into one selection area. Click Confirm Selection.
- d. You may also select two areas and do a paired comparison, or minus one area from another. To do this, click on the button **“Confirm and Add Advanced Selection.”** This basically allows you to select two areas. It is recommended that you first just use one area, then return to explore advanced selections after becoming comfortable with the On the Map tool.
- 3. After pushing Confirm Selection, a popup bubble should appear. Click on **“Perform Analysis on Selection Area”** in the bubble if you have not already done so. A new screen will pop up with various options for your analysis of the area.
 - a. The first selection is home or work. Do you wish to learn about workers who work in the area (in Townsend, or Lewis and Clark County if you did not do step 2), or do you wish to learn about people who live in the area? For now, select work.
 - b. The next selection is Analysis Type. Each of these options gives you slightly different data for analysis, like commuting patterns and demographics. Explore all of these later. For now, select Area Profile. You can also limit your analysis to certain subsets of workers, but for now, leave it at All Workers.
 - c. The next selection is Year. The most current year is 2014. Selecting multiple years will give you more data.
 - d. The last selection is Job Type. Primary jobs are those that the worker spends the majority of time at. The category All Jobs will also include secondary jobs that a worker works in part-time. For example, if a state worker had a bartending job on weekends to make some extra cash, the primary job is the state job, and the bartending job is the secondary job. Which selection depends on the purposes of your research. If you want to know about commuting patterns of workers during rush hour, you would probably pick only Primary Jobs, as the workers in secondary jobs aren’t traveling during rush hour. If you would like to know about all commuting patterns at all times, All Jobs is a better option. For now, let’s leave the selection on Primary Jobs.
- 4. After making your selections, click **Go!** This should add the data to your map. On the center map pane, you will see the job density of where workers in Lewis and Clark County (or Townsend) work. In the right pane, there is a report of workers in Lewis and Clark County (or Townsend) by demographic. This report information can be exported by clicking the Detailed Report link in the Left Pane. The Left Pane

also allows you to change some features of the map, such as the color of the bubbles, the year, and others.

5. Click Change Settings to go back to the selections pane and explore other types of analysis.
 - a. The next type of analysis we will explore is commuting patterns. Click on the Home button in the Settings selection box, then Distance/Direction. Select the year and type of job you are interested in, then press go. This map will show you where people who live in Townsend (or Lewis and Clark County) work. For Townsend in 2014, most people travel out to the Northwest to Helena for work. The purple bubbles on the map show the concentration of jobs, and the compass map indicates that over 250 people travel to the Northwest for employment.
 - b. Click Change Settings again and click the Destination analysis, leaving the home selection turned to home. Click go. The resulting map again shows where people who live in Townsend (L&C County) work. In 2014, 186 Townsend residents worked in their primary job in Townsend, with the next highest place being Helena.
6. Let change selection areas to Broadwater County. Above the left pane, there are tabs for Start, Base map, Selection, and Results. Click the x to close results, and click the selection tab. Under Drawing Tools, click "Clear Selection" to remove your old selection. Use Draw Point to place a dot in Broadwater County, then Change the Layer Selection to "Counties" (if it isn't already selected). Press Confirm Selection at the top of the left pane. Click "Perform Analysis on Selection Area" in the popup.
7. Let's look at people who live in Broadwater County. Select Home to select people who live in the selection area. Then select what analysis you wish to review. Area Profile will provide demographic and industry information. Check Destination, 2014, then All Jobs. This will include people who live in Broadwater and commute for their second jobs (in addition to their primary job). 20.7% of Broadwater County residents work in Helena city, with an additional 1.8% in the West Side of Helena (not the city itself). 6.5% of Broadwater County residents work in Bozeman.
8. Notice that there are 3% of Broadwater residents that work in Billings, and 3.1% that work in Missoula. Because the On the Map tool provides data at the Census block level, the data is "fuzzed" to prevent the identification of any particular individual or business. Because lots of people work in Missoula and Billings statewide, these two cities show up as a part of the fuzzing. There are probably some Broadwater County residents that do make the commute to those cities, but the counts are probably higher than actual due to the fuzzing. Small numbers of 1-3% should be reviewed cautiously to ensure that it is actual data instead of fuzzing. For example, there are 27 residents of Broadwater County that work in Belgrade. That is probably true because it makes sense, and Belgrade does not have enough of a population to show up in fuzzing. But the number commuting to Billings might be more or less than shown.